Plant Pathology Circular No. 66
February 1968

Florida Department of Agriculture
Division of Plant Industry

DOWNY MILDEW OF ROSE CAUSED BY PERONOSPORA SPARSA BERK.

S. A. Alfieri, Jr.

The downy mildew disease of rose has a history dating as early as 1862 as reported by Berkeley. It is highly sporadic in occurrence and varies in disease potential from very mild to severe epiphytotics.

The disease is prevalent wherever roses are grown, predominant particularly under greenhouse production. It has been reported in most European countries, including Russia, and Iceland, South America, Canada, and the United States. The first reported occurrence in the United States was made from California by Harkness and Moore. It is now generally prevalent in most rose-producing areas of the United States.

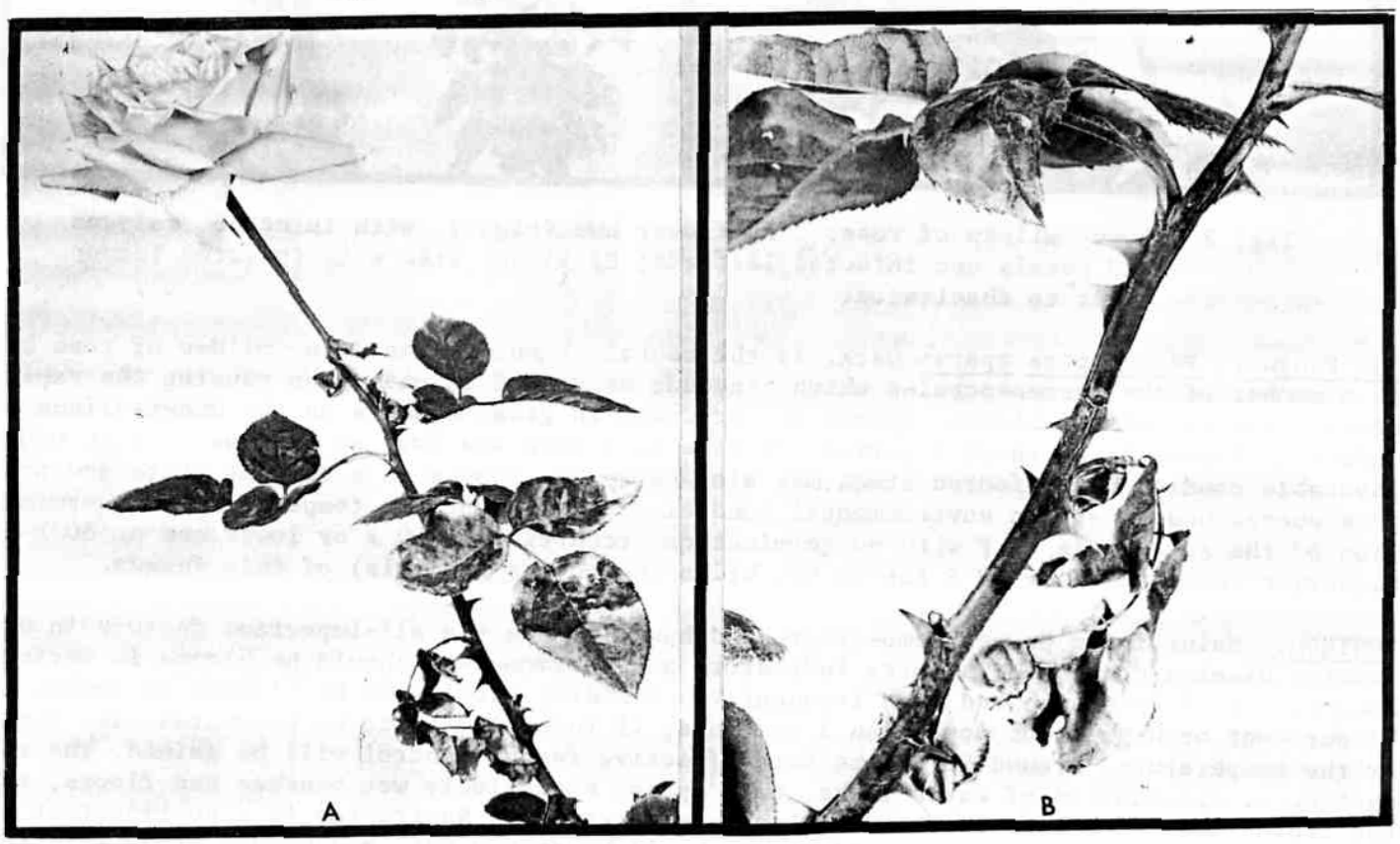

Fig. 1. Downy mildew of rose: A) leaf spots and necrotic leaves on stem prior to abscission; B) stem lesions and infected leaves.

SYMPTOMS. The downy mildew fungus occurs on leaves, stems, peduncles, calyces, and petals. The most prominent symptoms are those associated with the leaves and stems. Infected leaves develop reddish-purple to brown irregular spots and the leaflets eventually become chlorotic and necrotic (Fig. 1 A). Such leaves usually abscise, resulting in a largely defoliated flower stem (Fig. 2 B). Reddish-purple spots occur on the stems and peduncles, varying in size from very small to over 1 in. in length and are often discontinuous (Fig. 1 B). The calyces may develop similar spots and necrotic tips. Under severe conditions infected twigs may die. Although petals are seldom shown to be as susceptible to infection as leaves and stems, they nevertheless are affected, particularly at the stage prior to opening as observed by the writer during a recent outbreak of this disease among some outdoor container-grown roses (Fig. 2 A). Under conditions of severe infection,

blooming is delayed. The outstanding characteristic of downy mildew is the rapid killing or blighting of the leaves that is initiated by a spotting which has diffuse margins and is lighter in color than those caused by other leaf-spotting fungi of rose; this is followed by spectacular leaf drop.

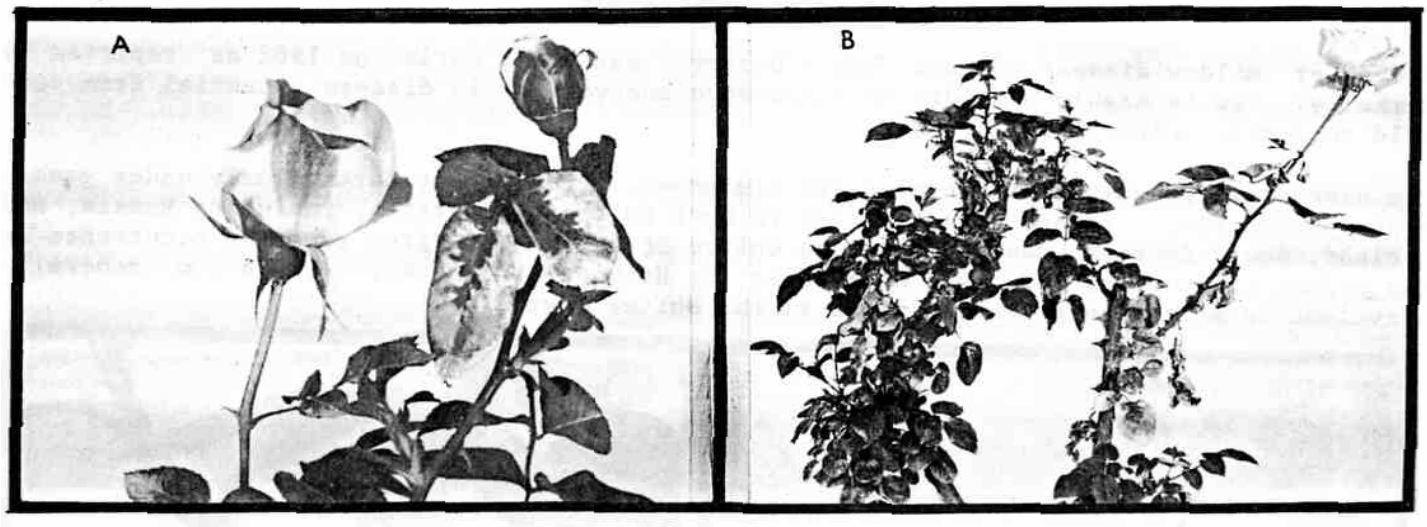

Fig. 2. Downy mildew of rose: A) flower bud (right) with infected calyces and petals and infected leaflets; B) flower stem with infected leaves prior to abscission.

The Fungus. Peronospora sparsa Berk, is the causal agent of the downy mildew of rose and is a member of the Peronosporales which include many serious pathogens causing the rapid, destructive blights of plants. Spores are produced in great numbers on the undersurface of infected leaves in as short a period of time as 3 days and for as long as 1 month under favorable conditions. Infected stems may also carry the fungus in a dormant state and produce spores under certain environmental conditions. The optimum temperature for germination of the spores is 65 F with no germination occurring at 40 F or lower and at 80 F or higher; a temperature of 80 F for 24 hrs kills the spores (conidia) of this fungus.

CONTROL. Maintaining proper temperature and humidity are the all-important factors in effective disease control. Humidity indicators and thermometers should be placed in various locations in rose houses and read frequently. Humidity should not be allowed to remain at 85 per cent or higher for more than 3 to 7 hrs, if infection is to be prevented. The warmer the temperature, around 80 F, the more effective fungus control will be gained. The reduction or elimination of water leaks, cold spots, excessively wet benches and floors, and the improvement of air circulation are to be encouraged. Sanitation is also important in controlling this disease. Infected stems should be pruned out and burned along with infected fallen leaves. The use of many kinds of fungicides has given varied results; however, zineb or maneb at 1 1/2 lbs per 100 gal of water with a good spreader-sticker can help to reduce the amount of downy mildew.

References

Baker, K. F. 1951. Moisture and diseases; control of humidity important factor in reducing crop losses. Flor. Rev. 108:15–16, 46–51.

Baker, K. F. 1953. Recent epidemics of downy mildew of rose. Plant Dis. Reptr. 37:331–339.

Cuboni, G. 1888. La peronospora delle rose. Staz. Speriment. Agr. ital. (Rome) 14:295–308.

MacLean, N. A. and K. F. Baker. 1951. Downy mildew of roses. Roses Inc. Bull. 160:5–6.